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Packaging machine

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I. Field of use

10 The invention concerns packaging machines and specifically intermediate elements installed therein. Such intermediate elements serve for fixing active elements such as for example robots, transposing apparatuses, conveyor belts and so forth, to a main frame structure of a packaging machine such as for example a CNC-top loading machine.

II. Technical background

15 In the case of the top loading machines which are used in the packaging industry the article is introduced from above into the cardboard box which is erected in the ready condition. The various working steps such as for example producing the boxes, filling the boxes and closing them are implemented by separate modules which are arranged in succession and in accordance with the function thereof within the packaging procedure along a packaging path. That makes it possible for the entire packaging
20 procedure to be designed in such a way as to be sound and reliable, and for the portions of the packaging path between the individual modules to be used as buffer zones in the event of a fault.

25 The generally prefabricated modules usually comprise one or more active elements such as for example transposing apparatuses or robots and are fixed to the main frame structure of the packaging machine, wherein the individual modules are removable or interchangeable for adaptation to a modified packaging procedure, in the event of a defect or for maintenance purposes.

30 Conveyor belts are also fixed to the main frame structure of the packaging machine and serve to convey the articles to be packaged along the packaging line.

Present day top loading machines are also produced using the so-called 'portal structure' in which pillars or columns are arranged in mutually

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opposite relationship on both sides along the packaging path and form the main frame structure of the packaging machine. Rails which are fixed to the pillars extend in the upper region of the two rows of pillars in the longitudinal direction over the packaging path. Transversely extending
5 holding rails or bars rest on the longitudinally extending rails, for fixing the modules, and are releasably fixed for displacement in the longitudinal direction of the packaging path.

A disadvantage which is to be seen in that arrangement however is that the transversely extending holding rails and with them the individual
10 modules can be fixed only to given locations on the longitudinal rails, which locations are provided with suitable holding devices or latching arrangements, and thereby fixed to the main frame structure, by means of clips, bolts or screw means.

Flexible direct adaptation of the arrangement of the modules to a
15 modified packaging procedure and simple stepless adjustment by displacement or alignment of the modules in the longitudinal and transverse direction is therefore not possible when a fault occurs or in the event of subsequently converting the individual modules.

a) Technical object

20 Taking the state of the art as its basic starting point, the object of the present invention is to design the intermediate elements, that is to say the longitudinal and transverse rails for fixing the individual modules, in such a way that both simple and flexible assembly of the modules is possible and the modules can be displaced both in the longitudinal direction
25 and also transversely with respect to the packaging path and can be fixed at any desired locations.

b) Attainment of the object

In accordance with the invention that object is attained by the features of claim 1.

30 Advantageous configurations of the invention are the subject-matter of appendant claims.

Fixed in the upper region of the main frame structure of the packaging machine, preferably at the same height in the longitudinal

direction over the packaging path, are two parallel, mutually spaced pairs of profile members, one to a respective lateral row of pillars of the main frame structure.

Disposed transversely with respect to the packaging path, for fixing the modules, are upper and lower second pairs of profile members which rest on the top side of the longitudinally extending first pairs of profile members and which bear against the underside respectively and which project on both sides beyond the first pairs of profile members which extend in the longitudinal direction and cross when considered in plan.

The profile members are preferably flat iron or bar members whose cross-section stands on edge, although it is also possible to use other profile members such as for example T-shaped, double-T-shaped, U-shaped, round or quadrangular profile members of iron or steel which can be in the form both of solid profile members and also hollow profile members.

At the locations at which the longitudinally extending first pairs of profile members cross the transversely extending second pairs of profile members, there are respectively disposed at a height between the mutually crossing intermediate elements, first clamping plates which respectively overlap the profile members and which, at the sides which bear against the longitudinally extending pairs of profile members, have projections which stick up laterally of the profile members in order to hold the profile members at a defined spacing and in order to form a guide means for sliding movement along one of the pairs of profile members.

In the same manner, at the sides which bear against the transversely extending pairs of profile members, the first clamping plates have projections which stick up laterally of the profile members and both hold the profile members at a defined spacing and also form a guide means for displacement of the pairs of profile members transversely with respect to the packaging path.

At the locations at which the intermediate elements cross, on the top side of the upper second pairs of profile members and on the lower side of the lower second pairs of profile members, there are respective second

fitted clamping plates which respectively overlap both profile members and which, at the sides which bear against the upper and lower second pairs of profile members, respectively have projections which stick up laterally of the profile members in order to hold the profile members at a defined

5 spacing.

In addition the clamping plates have through openings so that, at the locations at which first and second pairs of profile members are in mutually crossing relationship, there is an intermediate space therethrough, through which a clamping mechanism extends in perpendicular relationship to the
10 intermediate elements in plan view, the clamping mechanism clamping the clamping plates and the intermediate elements or the first and second pairs of profiles together.

The first and second clamping plates preferably comprise iron or steel, while the projections or the mutually transversely extending openings
15 can be produced in the form of an extruded member.

The clamping mechanism can be a clamping screw or a cam lever which is very simple and quick to release.

The advantage of this invention is that the modules which are fixed to the upper and/or lower second pairs of profile members, together with
20 the second pairs of profile members themselves, the clamping plates and the clamping mechanism, can be steplessly displaced to any desired location in the longitudinal direction of the packaging path, with the clamping plates sliding in the longitudinal direction.

For the purposes of fixing further active elements such as for
25 example robots, conveyor belts or transposing devices, it is possible to provide further intermediate elements in a second region of the main frame structure.

The first pairs of profile members which extend along the packaging path can be fixed for example only to those pillars which form the
30 beginning and the end of the packaging line so that the first pairs of profile members are disposed in a freely floating condition within the packaging line and thus displacement of the modules is possible along the entire packaging line.

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With the present invention, it is easily possible for a packaging machine to be modified and converted or in the event of faults and disturbances occurring, it is possible to intervene rapidly in an ongoing packaging procedure and, as there are no predetermined fixed positions or latching locations, the modules can be positioned and oriented relative to each other very precisely and in accordance with the operating conditions involved.

c) Embodiments

The invention is described in greater detail by way of example hereinafter with reference to drawings in which:

Figure 1 shows a side view of the intermediate elements, with the pairs of profile members which extend transversely with respect to the packaging line being shown in cross-section,

Figure 2 shows a front view of the intermediate elements, with the pairs of profile members which extend in the longitudinal direction of the packaging line being shown in cross-section, and

Figure 3 shows a plan view of the arrangement shown in Figure 2.

In the embodiment hereinafter, the intermediate elements used are in the form of flat iron or bar members 1 whose cross-section is standing on edge, thereby affording an arrangement enjoying maximum stability.

Figure 1 shows an upper and a lower pair of flat bar members 12 and 13 in cross-section, with the on-edge cross-sections of the flat bar members 1 being arranged in pairs in mutually juxtaposed relationship. Laid on the two narrow sides of the upper and lower pairs of flat bar members 12 and 13 are respective first and second clamping plates 2 and 2' which overlap the narrow sides and have projections 3 which stick up laterally of the narrow sides, whereby the flat bar members 1 are held at a defined spacing from each other. The flat clamping plates 2 which are arranged between the upper and lower pairs of flat bar members 12 and 13 and the pairs of flat bar members 11 also have at the oppositely disposed sides projections 3 which stick up at the narrow sides of the pairs of flat bar members 11, as can be seen from Figure 2.

Consequently the first clamping plates 2 have projections 3 at both sides and thereby form mutually transversely extending guide means for sliding movement of the first clamping plates 2 in the longitudinal direction or for sliding movement of the flat bar members 1 in the guides of the first clamping plates 2.

Clamping screws 4 which extend in plan view perpendicularly to the pairs of flat bar members 11, 12 and 13 between the pairs of flat bar members 1 and through the through openings 7 in the first and second clamping plates 2 and 2' clamp the pairs of flat bar members 11, 12, 13 and the first and second clamping plates 2 and 2' together.

By releasing the clamping screw 4 and thereby the clamping action, the pairs of flat bar members 12, 13 to which the modules are fixed (this cannot be seen in the drawings), together with the first and second clamping plates 2 and 2' and the clamping screws 4, can be displaced in the direction of the arrows shown in Figure 1. In that case, a portion of the clamping screw 4 is guided in contact-less manner between the two flat bar members 1 of the pairs of flat bar members 11.

After release of the clamping screw 4, the pairs of flat bar members 12 can also be displaced in a direction transversely with respect to the packaging line, as indicated by the arrows in Figure 2, thereby permitting still more accurate adjustment of the modules.

Figure 3 is a plan view of the structure shown in Figure 2 and shows the pairs of flat bar members 11 and 12 respectively comprising two parallel, mutually juxtaposed flat bar profile members, and clamping plates 2 which lie on the pairs of flat bar members 11 and which are fixed to the pairs of flat bar members 11 by means of clamping screws 4.

LIST OF REFERENCES

- 1 flat bar member
- 2 first clamping plates
- 2' second clamping plates
- 3 projections
- 4 clamping screw
- 5 opposite side
- 6 transverse opening
- 11 pair of flat bar members
- 12 upper pair of flat bar members
- 13 lower pair of flat bar members

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